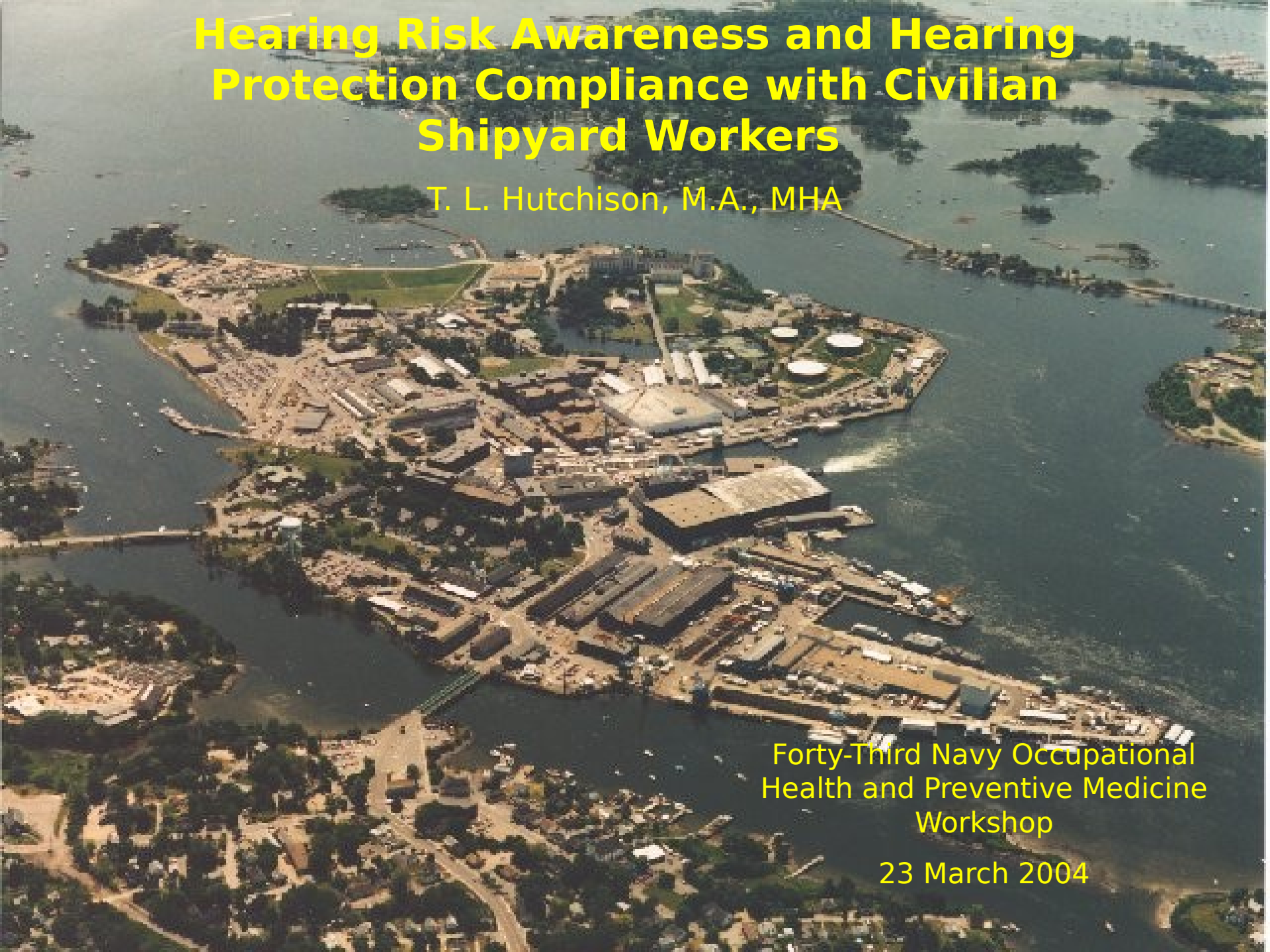
Hearing Risk Awareness and Hearing Protection Compliance with Civilian Shipyard Workers

T. L. Hutchison, M.A., MHA



Forty-Third Navy Occupational Health and Preventive Medicine Workshop

23 March 2004

WITH THANKS TO:

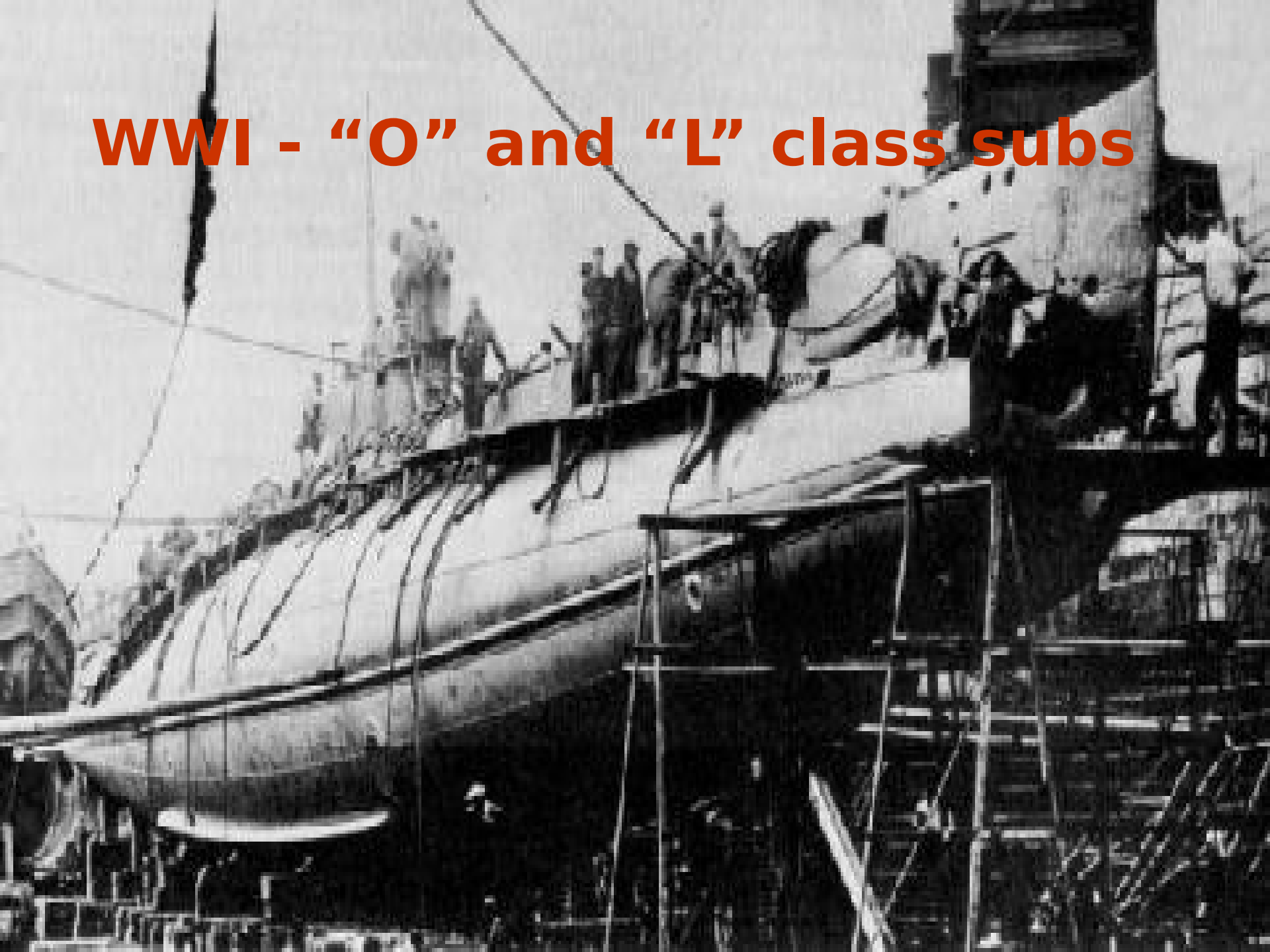
- Mr. Ed Szymkiewicz, NHCNE Portsmouth
- Ms. Janice Mire, NHCNE Portsmouth
- Ms . Mary Reynolds, NAVOSH, Portsmouth

In 1694 the Portsmouth Shipyard was building and repairing ships for the King’s Navy.

During the Civil War – Ironclads

USS Kearsage

WWI - “O” and “L” class subs



WW II – over 20,000 workers building, repairing, refurbishing the submarine fleet.

Current Mission (s):

Overhaul facility for repair, modernization, and refueling of LA Class nuclear powered submarines;

Planning yard for the Navy’s deepest diving submarine and submersible;

Scientific research, defense prototype testing, and submerged rescue platforms.

Home port for C.G.C.'s for Homeland Defense

Technology has changed but noise remains a problem .

Noise Exposure has always been an Issue in ship / boat building and repair.

Hearing loss remains the leading chronic occupational illness.

Millions of dollars are spent yearly for compensation for “occupational” hearing loss.

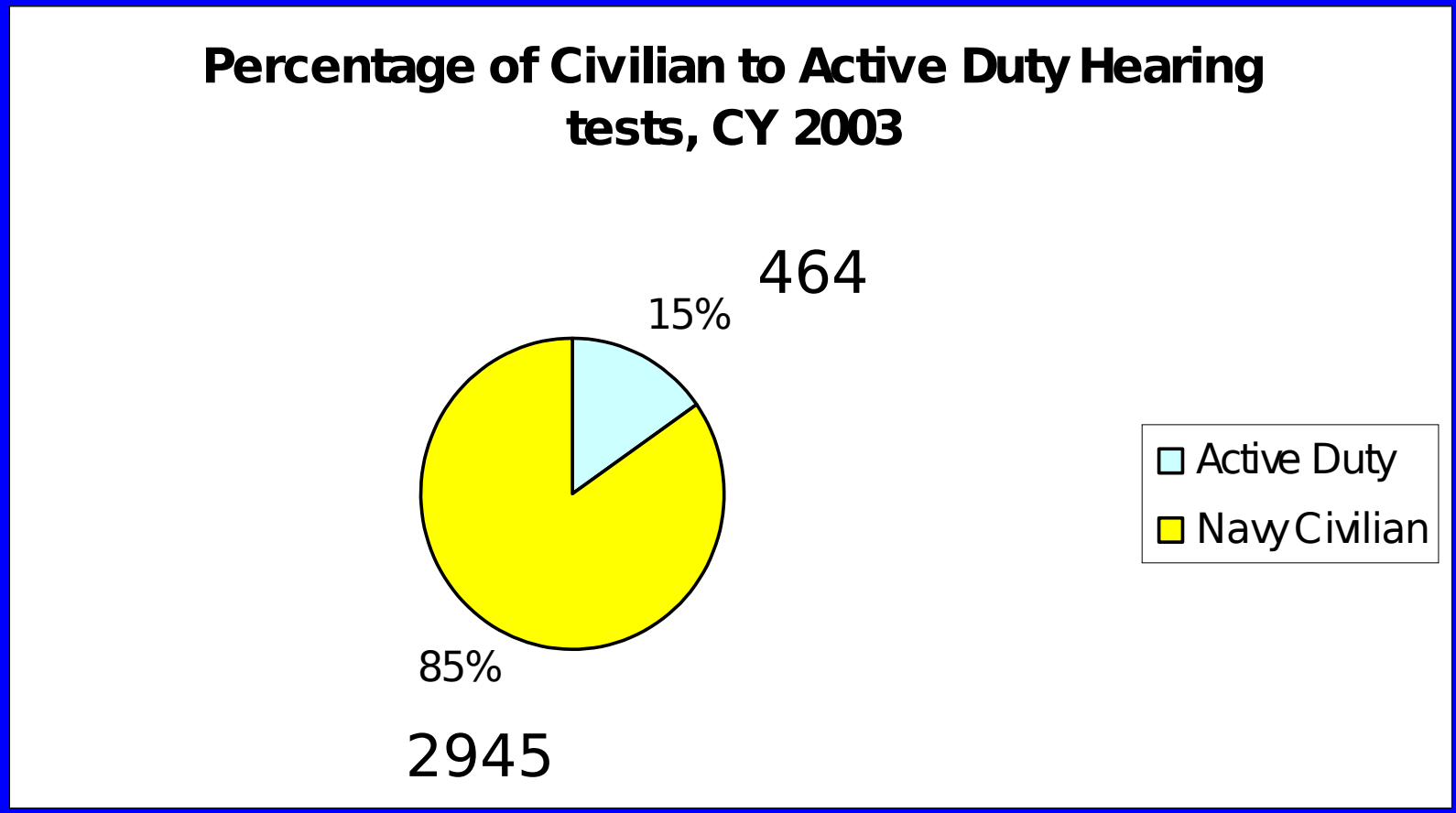
HEARING CONSERVATION PROGRAM AT PORTSMOUTH NAVAL SHIPYARD IN 2003

Population tested in Portsmouth under DOEHRS-HC system in 2003

3503 “Periodic” tests recorded

Air Force	.24%
Army	.94%
USMC	.53%
Navy	96.97%
Other	1.32%

Distribution of Navy "periodic" tests in 2003



SINCE

- Majority of test are on civilians.
- Civilian population thought as more geographically “stable”.
- Civilian population with audiometric history available.
- Civilian population has fairly consistent industrial history.

Of those tested January to December, 2003:

- Of the **2945** Navy civilians tested **1069** recorded as “STS” – **(36.3%)** **(DOEHRS-HC report)**
- Actually **647** - **(22%)** showed true STS
  - **422** tests multiple count, did not complete disposition within 30 days, or issues like the wrong baseline being compared, etc.

103 (16%) of the 647 Navy civilians with true STS were ultimately considered to have a **NIPTS**.

(More accurately, those that Occupational NIPTS could not be ruled out.)

- Conductive hearing losses
- Other personal medical conditions
- Off job noise exposure (reserves / part time jobs / recreational activities, etc..)
- Functional overlay

Profile of NIPTS

- Employed at the Shipyard 20.2 yrs.
- Average age 47
- 100% male
- 45% have had baseline reestablished at least twice

(average length of time on the job prior to 1st PTS was 11.8 yrs.)

(average time between 1st and 2nd PTS was 8.9 yrs)

Notes: There is generally less noise exposure with more positional seniority so should expect longer period between baseline resets.

Profile of NIPTS

Which trades at this Shipyard Experienced NIPTS in 2003:

Crane Operator	2
Insulator	2
Sheet Metal Mechanic	2
Eng. Technician	2
Police/Security	4
Electronic Mechanic	5
Rigger	5
Marine Mach. Mechanic	6
Painter/Blaster	6
Pipe Fitter	7
Electrician	7
Shipfitter	7
Welder	8
Machinist	9
misc. 37 trades	31

Profile of NIPTS

Measured "Average" Noise Exposures:

(IH Noise Exposure Data by Trade, Portsmouth Naval Shipyard, no date available)

	Hrs. per day	Levels
Crane Operator	4-6	75 to 100dBA
Insulator	2	90 – 98 dBA
Sheet Metal Mechanic	3	98-112dBA
Eng. Technician	.012	85- 90 dBA
Police/Security	2.5	85 – 94dBA
Electronic Mechanic	.5	85 –90dBA
Rigger	1	85 – 100 dBA
Marine Mach. Mechanic	3-6	70 – 100 dBA
Painter/Blaster	5	102 – 113 dBA
Pipe Fitter	3	96 – 97dBA
Electrician	1	94 –117dBA
Shipfitter	4	94- 96 dBA
Welder	5.5	85 – 118dBA
Machinist	6	(variety from 70 to 100+dBA)

misc. 37 trades <1%

Profile of NIPTS

- *Averaged* measurement assessment of noise exposure – 2.89 hrs./day

(IH Noise Exposure Data by Trade, Portsmouth Naval Shipyard, no date available)

* To be valid need each workers dosimetry v. trade estimate

Things we were trying to look at

- Perceived v. actual occupational noise exposure.
- Impact of training on STS rate, utilization of hearing protection, and utilization of hearing protection,

HCP Training and Orientation

Employees are provided with orientation upon hire and yearly that includes:

- Physical and Psychological effects of noise
- Recognition of noise-hazardous area/equipment
- Audiometric testing process and purpose
- Selection, fitting, use and care of HPD’s
- Responsibilities under the Navy’s HCP
- Hearing loss and its effects

- Interested in valid feedback from workers.

- Comparison of subjective to “objective” data.

Questionnaire developed to administer to workers that exhibited NIPTS.

- 1st trial period with questionnaire matching with test, not surprisingly, resulted in 100% compliance with HPD on and off the job with hearing protection & very high noise exposure per trade and little, or no, off job noise exposure.
- Changed to “anonymous” questionnaire other than date and trade. Used that identifying information compared to Navy Log of Illnesses and Injury to match by trade but not by individual.

The Questions:

The Questions:

1. Name the noise sources in your work area.

The Questions:

2. # of hrs. per day / week / month exposed to potentially hazardous noise on the job.

The Questions:

3. # of hrs. per day / week / month exposed off the job.

The Questions:

4. Use of HPD – On job:

    When posted;

    When too loud;

    I Don’t wear hearing protection on the job;

    I’m often exposed without warning and then I use HPD.

The Questions:

5. Use of HPD – Off job:

   I Always wear HPD around “noise”;

   I wear HPD when I think it’s too loud;

   I don’t wear HPD away from work

The Questions:

6. Type of HPD used On the job (Single) :
   - Disposable
   - Pre-molded
   - Sound-Bans (Not encouraged)
   - “Noise muffs”
   - Hard hat mounted

The Questions:

7. Type of HPD used On the job (Double) :

Disposable

Pre-molded

with

Noise muffs

Hard hat mounted

The Questions:

8. Do you know the level(s) when hearing protection is required on the job?

    yes

    no

9. Identify levels

    Single protection

    Double protection

Results of questionnaire:

The Answers:

1. Noise sources in your work area – variety

The results were intended for f/u by Safety for on-site follow-up.

The Answers:

2. ***# of hrs. per day/week/month exposed <u>on job</u>***

35% self-reported an average <u>daily</u> hazardous noise exposure of 3.27hrs.

65% reported an average <u>weekly</u> hazardous noise exposure of 4.78 hrs.

RECALL - Measured average noise exposure 2.89hrs./day

Lesson learned: keep it consistent – only ask e.g. hrs. per week and define “hazardous”.

The Answers:

3. # of hrs. per day/week/month exposed off the job.

35% reported some noise away from work averaging 5.9 hrs. per month.

65% reported **NO** exposure off the job.

Lesson learned: keep it consistent – only ask e.g. hrs. per week and define “hazardous noise”.

The Answers:

4. ***Use HPD – <u>On job</u>:***

When posted: 88%

When too loud: 72%

Don't wear: 0%

Often exposed without warning but then use: 97%

Lessons learned: Ask: "***Only*** when too loud" and define ***loud***.

Ask: circumstances of being exposed without warning.

The Answers:

5. ***Use HPD – Off job:***

Always around “noise”: 56%

When I think it’s too loud: 39%

Don’t wear away from work <1%

Didn’t answer 4%

Lesson learned: Provide definition of “**noise**” and “**loud**”.

The Answers:

6. Type of HPD used On the job when using Single protection:

Disposable	89%
Pre-molded	22%
Sound-Bans	<1%
Noise muffs	39%
Hard hat mounted	0% **

Lesson learned: Ask why one preferred over another

** Limited distribution of hard hat mounted muffs.

The Answers:

7. ***Type of HPD used On-the-job when using double protection: 44% do not use double***

Disposable	100% with Muffs
Pre-molded	33% with Muffs
Hard hat mounted	0% **

** Limited distribution of hard hat mounted muffs.

Lesson learned:	Ask type of HPD used off-the-job

The Answers:

8. ***Do you know the level(s) when hearing protection is required.***

yes 27%

no 73%

9. Identify levels (actually knew)

Single protection 5% correctly identified 85dBA

Double protection 0%

Lesson learned: Is it important for workers to know dBA level?

CONCLUSIONS

- Overestimation of true STS, certainly NIPTS, in this population if relying on DOEHRS data alone;
- Workers are probably overestimating noise exposure on-the-job and underestimating off-the-job exposure;
- Workers did not rely upon dBA level/knowledge but rely upon posting of areas/equipment and subjective interpretation of noise levels to determine when HPD is needed.
- Workers don't always wear hearing protection at work when posted.

CONCLUSIONS

- Workers in this population preferred disposable ear plugs.
- Over half to three-quarters (always/when loud) report using HPD off the job (training carry over?)
- Speculate that recreational noise, medical conditions (e.g., cholesterol, diabetes, etc.) influencing multiple TTS due to the shortened time between 1st and 2nd reset baselines where noise exposure decreases.
- Probably wouldn't try this type of questionnaire again without a lot of thought and multiple refinements.